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Summary and Response to Public Comment: Amendments to Point Source Nutrient Control Regulations for Dischargers in the Chesapeake Bay Watershed November 2005

A) Re-opened Public Comment Period (7/25/05 to 8/24/05) – York and James Basin Nutrient Waste Load Allocations
B) Comments on Water Quality Modeling Results (10/17/05 to 11/1/05)

In the re-opened public comment period on the nutrient control regulations for dischargers in the Chesapeake Bay watershed, many detailed comments were received from a total of 69 respondents. Among these were requests for revised nutrient waste load allocations for several significant dischargers located in the York and James Basins.

At the State Water Control Board's September 27, 2005 meeting, staff recommendations were accepted for changes to waste load allocations requested by dischargers in the Shenandoah-Potomac, Rappahannock, and Eastern Shore basins. Requests for increased waste load allocations from dischargers in the York and James basins were deferred at that time, to be addressed when final recommendations for the special water quality standards proposed for those waters (site-specific dissolved oxygen in the Pamunkey and Mattaponi; numeric chlorophyll criteria in the James) are presented to the Board at their November 21, 2005 meeting. Time was provided to allow additional water quality model runs to be made for the York and James basins by the EPA-Chesapeake Bay Program Office, with point source nutrient reduction scenarios developed in consultation with representatives of the Virginia Association of Municipal Wastewater Agencies (VAMWA). These scenarios simulated varying levels of point source nitrogen and phosphorus discharge, and the resulting water quality conditions that were evaluated in terms of compliance with the new tidal water quality standards already adopted by the Board, and the special standards for the York and James that are being considered for recommendation to the Board at their November meeting. The results of the additional water quality modeling runs were offered for public comment from October 17 – November 1, 2005.

Comments and responses are summarized below for both these review periods.

PUBLIC COMMENT ISSUES

A. York and James Basin Nutrient Waste Load Allocations - Water Quality Management Planning Regulation (9 VAC 25-720-60-C., James River Basin, and 9 VAC 25-720-120-C., York River Basin)

1. **Comment**: Five dischargers in the York basin and ten dischargers in the James basin requested increased nutrient load allocations, the major reasons being a claim that they will have expanded treatment facilities in operation by 2010, or less stringent treatment levels can be required and still achieve the State's water quality restoration goals.

***Response*:** *Establishing nutrient load allocations has been based, in part, on the design capacity of the wastewater treatment facility that is certified for operation by 2010. Several owners requested additional nutrient load allocations due to claims their facilities will be expanded by that date. After staff review of the information submitted by these owners, some were judged to have provided reasonable assurance that their treatment facility would be certified to operate at the expanded flow by 2010. In these cases, the higher allocation was included in the regulation, usually with a footnote in the river basin table that stated the allocation would revert to the amount based on their existing design flow if the expanded facilities were not on-line by 2010.*

For dischargers that did not receive a requested higher allocation, staff believes some assurance has been provided that an increase in allocation will be considered in the future should their facility be expanded and operational by 2010. At the September 21, 2005 meeting, the Board adopted a new section, 9 VAC 25-720-40.D., which recognizes the Board may amend the regulation in the future to adjust individual nutrient load allocations for a number of reasons, including completion of a plant expansion as evidenced by issuance of a Certificate to Operate by December 31, 2010. The section also states that any adjustments to allocations must ensure water quality standards are maintained.

Based on staff review of requested waste load allocation (WLA) increases, figures in the Water Quality Management Planning Regulation either remain unchanged or have been revised as follows for facilities in the York and James Basins:

York

- *Caroline County Regional STP - WLAs currently based on 0.5 MGD design flow; request increase based on 3.0 MGD. Caroline County claims the expanded plant will be in service by 2010, but no major milestones timeline (e.g., permit modification, preliminary engineering report [PER], plans and specifications, bidding, construction) was provided. Evidently a consultant has just begun work on a re-rating study, optimization of existing plant, and PER development. Design flow basis for WLAs remains unchanged, as project is still in very early planning stages with no reasonable assurance the expanded plant will be certified for operation by December 2010.*
- *Hanover Co.-Totopotomoy STP – WLAs currently based 5.0 MGD design; request increase based on 10.0 MGD. The plant's discharge permit has a 10.0 MGD flow tier, and the County provided details on investments in current plant (over 35%) for units capable of treating 10.0 MGD, a Capital Improvement Program schedule beginning in July 2008 for the remaining work to bring the full plant capacity to 10.0 MGD, and Comprehensive Plan estimates of*

average daily flows reaching 10.0 MGD by 2010. WLAs have been revised based on 10.0 MGD, but Certificate to Operate (CTO) for expansion must be secured by December 2010, or WLAs will decrease based on a design flow of 5.0 MGD. Hanover County also requested consideration for less stringent treatment requirements (8.0 mg/l TN rather than 4.0 mg/l; 1.0 mg/l TP rather than 0.3 mg/l) as the basis for their WLAs, and this comment is addressed in a section following on the James and York Water Quality Modeling Results.

- *Rapidan S.A.-Gordonsville STP: Rapidan S.A. requested consideration for less stringent treatment requirements (8.0 mg/l TN rather than 4.0 mg/l; 1.0 mg/l TP rather than 0.3 mg/l) in the basis for their WLAs, and this comment is addressed in a section following on the James and York Water Quality Modeling Results.*
- *Smurfit-Stone: 23.0 MGD design flow figure used as basis for WLAs approved by the Board on June 28, 2005. In the first public comment period on regulation amendments, owner provided process and instrumentation diagrams to support claim for 26.0 MGD design capacity, and has restated this claim in re-opened comment period. Owner-furnished figures used for treatment works (in gallons per minute) were the maximum ratings for unit processes, which is an unlikely operating status to be sustained under normal production conditions ("normal" operation capacity of units totaled 18.4 MGD). Therefore, the design flow basis for WLAs remains 23.0 MGD, based on the preceding and several other factors:*
  - *The facility's groundwater permit limits total withdrawal to 8.4 billion gallons/year (approximately 23.0 million gallons/day).*
  - *Other discharge permit parameters (e.g., BOD5 limitations) are water quality based and more stringent than the applicable Federal Effluent Guidelines (that are production based). Thus, an increase in design flow would require a corresponding decrease in effluent concentrations to maintain regulatory loading caps for other pollutants, a capability the owner has not demonstrated in the materials provided.*
  - *Facility is permitted as an industrial wastewater treatment plant; permit limitations and other technology-based WLAs are based on actual production rates and their associated flows. The existing bleach plant has a demonstrated capability to support 805 machine dried tons per day bleached Kraft pulp production (market plus paperboard). The permit was written to allow for this potential increase in production, and the facility has demonstrated that production rate without having an effluent discharge which exceeded the 22.21 MGD reported 30-day maximum flow.*
  - *Use of 23.0 MGD as full production-based design flow is a significant percentage (about 89%) of the claimed maximum design flow (26.0 MGD), which is consistent with the approach used for other industrial dischargers.*

  Owner also requested consideration in the basis for their total phosphorus WLA for a less stringent treatment requirement (1.5 mg/l rather than 1.0 mg/l) to be consistent with the feasible treatment level at pulp/paper mills selected as equivalent to enhanced nutrient reduction at POTWs. This comment is addressed in a section following on the James and York Water Quality Modeling Results.

James

- *Buena Vista STP – WLAs currently based 2.25 MGD; City requested increase based on 3.0 MGD. While permit reissued on 11/01/04 included a future design flow tier of 3.0 MGD, this does not determine the basis for WLA calculations, which is based on the design flow certified*

for operation by December 31, 2010. No major milestones timeline (e.g., permit modification, preliminary engineering report [PER], plans and specifications, bidding, construction) was provided. Design flow basis for WLAs remains unchanged, as no reasonable assurance has been documented that the expanded plant will be certified for operation by December 2010.

- *Georgia Pacific – WLAs currently based on 8.0 MGD design flow; requested increase based on 10.87 MGD. Owner provided design basis for the wastewater treatment system, which was established based on the proper functioning of the activated sludge treatment system. The limiting design flow is 10.87 MGD, and is based on the 90% point of the peak overflow rate for the secondary clarifier. Since owner has not claimed capacity based on maximum ratings for unit processes, WLAs have been revised based on 10.87 MGD.*
- *South Central Wastewater Authority-Petersburg STP - WLAs currently based on 23.0 MGD; request increase based on 27.0 MGD. No major milestones timeline (e.g., permit modification, preliminary engineering report [PER], plans and specifications, bidding, construction) was provided. Design flow basis for WLAs remains unchanged, as no reasonable assurance has been documented that the expanded plant will be certified for operation by December 2010.*
- *J.H. Miles, Inc. – WLAs currently set at TN = 158,826 lbs/yr; TP = 18,654 lbs/yr. Owner provided updated information on the evaluation of process changes and other cost-effective measures to reduce nutrient loads. A combination of holding discharge flow at current 0.35 MGD average (rather than using full design flow of 0.55 MGD), limiting production days (5 days/week average), substituting cleaning chemicals with less phosphate content, and reduction of marinate sent to waste treatment is projected to reduce the plant's annual TN and TP loads by 18 and 42 percent, respectively, over annual loads that could be discharged at full design flow and 7 days/week operation. Revised WLAs are TN = 153,500 lbs/yr; TP = 21,500 lbs/yr.*
- *Several facility owners (Chesterfield County, Town of Crewe, Hampton Roads Sanitation District, Hopewell Regional Wastewater Treatment Facility, City of Lexington, Lynchburg STP, Maury Service Authority, Rivanna Water and Sewer Authority) requested consideration for less stringent treatment requirements in the basis for WLAs at their plants, and this comment is addressed in a section following on the James and York Water Quality Modeling Results.*

2. **Comment**: Reserve waste load allocations for two York Basin non-significant dischargers that have, or are planned to go off-line based on current permitted capacity and total nitrogen and total phosphorus concentrations reflecting secondary treatment levels (no additional nutrient removal treatment); provide explicit allocations for non-significant plants in regulation. (Spotsylvania Co. Utilities)

***Response**: The WQMP regulation only deals with allocations for Significant Dischargers. Non-Significant Dischargers are dealt with through the rulemaking now underway for the Watershed General Permit (WGP; authorized by the 2005 Nutrient Credit Exchange Program statute). The agency will consider means through the WGP process to not discourage regionalization, but also to recognize the need to maintain loading caps.*

B. James and York River Water Quality Modeling Results – *comments pertaining to point source nutrient waste load allocations are covered in the following section. Comments on appropriate water quality standards will be addressed in the agenda item for York and James Special Standards.*

Comment: during the re-opened public review period (July-August) for the WQMP Regulation, several dischargers in the York and James basins requested increased nutrient waste load allocations that would result from less stringent treatment requirements (higher effluent nitrogen or phosphorus concentrations), rather than increased design flow figures, generally as follows: Do not adopt James and York waste load allocations until after approval of final water quality standards for these basins; consider less stringent requirements that can achieve same environmental objectives; review additional modeling results simulating less stringent treatment and resulting water quality standards compliance before finalizing nutrient allocations. (Chesterfield County, Town of Crewe, Hampton Roads Sanitation District, Hopewell Regional Wastewater Treatment Facility, City of Lexington, Lynchburg STP, Maury Service Authority, Rivanna Water and Sewer Authority, VAMWA)

***Response*:** *The response to these comments was deferred at the Board's September 21, 2005 meeting. A key reason for deferring staff recommendations on the James and York nutrient waste load allocations was to allow time for the EPA-Chesapeake Bay Program Office to run additional water quality modeling scenarios that had been negotiated with the Virginia Association of Municipal Wastewater Agencies. These scenario runs simulated varying nutrient reduction levels at the wastewater treatment plants in the York and James basins, with an assessment of the resulting water quality conditions in terms of compliance with dissolved oxygen standards in the York, and proposed numeric chlorophyll criteria in the James.*

Two model scenarios were run, identified as "VATSJY1" and "VATSJY2" (VATS = Virginia Tributary Strategy; JY = James and York). Table 1 shows the nutrient removal levels for publicly owned treatment works (POTW) that were simulated, as follows:

Table 1. Annual average POTW point source total nitrogen (TN) and total phosphorus (TP) concentrations by basin and scenario.

Basin: Region	Scenario VATS JY1		Scenario VATS JY2	
	TN	TP	TN	TP
James River:				
Above Fall Line	6.0 mg/L	0.5 mg/L	6.0 mg/L	0.5 mg/L
Tidal Fresh	5.0 mg/L	0.5 mg/L	5.0 mg/L	0.5 mg/L
Lower Estuary	5.5 MPY	1.0 mg/L	6.9 MPY	1.0 mg/L
York River	6.0 mg/L	1.0 mg/L	8.0 mg/L	1.0 mg/L
Other basins	VATS or TS		VATS or TS	

Notes: NPS and sediments at VATS for James and York Rivers. James Lower Estuary nitrogen shown in million pounds per year (MPY).

After receiving the model results, DEQ staff drafted a set of management options that were shared and negotiated with POTW owners, industrial discharger representatives, citizen conservation organizations, and EPA. These management options also considered treatment levels that differed from those in the two scenarios above, with justification that included the expected water quality response, the reliability and cost-effectiveness of point source controls,

consistency with policy decisions previously made in other Bay basins regarding use of stringent treatment, and achievement and maintenance of load caps committed to by the Chesapeake 2000 Agreement signatories.

In response to the October-November review period on the additional James and York water quality modeling runs, several commenters either endorsed a particular combination of treatment levels, or stated that the water quality conditions resulting from simulation of less stringent treatment requirements supported their requests for increased nutrient waste load allocations, as follows:

York Basin

- *Chesapeake Bay Foundation – "…fully supports the recommendations in the Management Options… (POTWs at 6 mg/L TN and 0.7 mg/L TP; 2 paper mills at 1.0 mg/L TP)…"*
- *EPA Region 3 – "EPA supports the York River basin point source allocations as outlined in the Management Options … allocations are supportive of Virginia's adopted and proposed water quality standards …allocations also ensure the entire burden of the required nutrient reductions does not fall on nonpoint sources…"*
- *Hampton Roads Sanitation District – "…recommends that the POTW point source allocations be established at the conditions evaluated in VATS JY2 (TN=8 mg/l, TP=1.0 mg/l at design flows)."*
- *Hanover County Utilities – "…nutrient allocations based on 6 to 8 mg/l and 1 mg/l of total nitrogen and total phosphorous respectively are appropriate based on the model results."*
- *Virginia Association of Municipal Wastewater Agencies – "…allocations for York River dischargers should be based on at least 8 mg/l total nitrogen and 1 mg/l total phosphorus because all of the desired water quality benefits are attained at these levels."*

***The agency response to these comments**, as well as the other York discharger requests for less stringent treatment requirements submitted during the July-August re-opened review period, has been addressed through the management options described above. Following is the recommended option, with justification for the treatment levels selected.*

***1. York Basin Nitrogen Waste Load Allocations:** Base POTW allocations on TN = 6.0 mg/l**;** retain industrial treatment levels, equivalent to enhanced nitrogen reduction at POTWs, as approved in June 2005. Justification for this selected option:*

- *Significant nutrient reduction needed to address existing poor water quality as evidenced by non-attainment of dissolved oxygen criteria in the lower river - ranging from 21% to 34% (from initial 2006 assessment results).*
- *Consistent with approach of using stringent technology to protect water quality.*
- *Total York point source discharged nitrogen load in 2000 was ~1.2 million pounds per year (MPY). An allocation based on TN = 8 mg/l only keeps point source loading at that level. A POTW allocation based on TN = 6 mg/l will reduce the load to 1.0 MPY.*
- *Increases likelihood of achieving water quality standards since nutrient reduction by point sources is more reliable than implementing nonpoint source controls.*

2. York Basin Phosphorus Waste Load Allocations: *Base POTW allocations on TP = 0.7 mg/l and two paper mill allocations (Bear Island Paper [co-discharge with Doswell STP] and Smurfit Stone) on 1.0 mg/l; retain other industrial treatment levels, equivalent to enhanced phosphorus reduction at POTWs, as approved in June 2005. Justification for this selected option:*

- *The estimated total York point source phosphorus load delivered to tidal waters in 2000 was ~0.164 MPY. An allocation based on TP = 1.0 mg/l for the POTWs and 1.5 mg/l for the two paper mills would be ~0.233 MPY delivered, a 42% increase over 2000 loads.*
- *An allocation based on POTWs at 0.7 mg/l and the paper mills at 1.0 mg/l is ~0.166 MPY delivered, which essentially holds-the-line. This would be acceptable since it appears phosphorus does not significantly influence water quality in the lower portion of the river.*
- *When this allocation is added to the total phosphorus loads in the other Virginia river basins, the total phosphorus tributary strategy loads are within 1% of the 6.0 MPY Virginia allocation.*
- *At a minimum, allocations should be set so the basin-wide point source loads do not increase from year 2000 levels.*

James Basin

- *Chesapeake Bay Foundation – "…fully supports the recommendations (as proposed in the DEQ staff correspondence referenced above)" [i.e., management options], "for… TN and TP allocations for POTWs above the fall line, TP allocations for POTWs in the Lower Estuary and phased reductions for TN allocations at POTWs in the Lower Estuary."*
- *EPA Region 3 – "EPA supports the James River basin point source allocations for the above fall line, tidal fresh segment and …total nitrogen allocations for the lower estuary facilities as outlined in the Management Options …. The allocations are supportive of Virginia's proposed chlorophyll a water quality criteria for the tidal James River and its tidal tributaries."*
- *Hampton Roads Sanitation District – "VATSJY2 loads are representative of anti-degradation levels."…"There is no need to establish an allocation for the lower James River on the basis of BNR (i.e. 8 mg/l) as a minimum treatment level."…"There is no present need to "phase in" a more stringent allocation than 6.9 MPY."…"The attainment of existing interim State-wide nutrient allocation values is irrelevant."*
- *Hopewell Regional Wastewater Treatment Facility - supports the results of the water quality modeling for the tidal fresh James River, which confirms the previously approved total nitrogen WLA for HRWTF. Requests total phosphorus WLA increase based on 0.8 mg/l, rather than 0.5 mg/l, due to industrial nature of their wastewater and high cost to an already fiscally stressed municipality.*
  Response: *Hopewell's phosphorus WLA approved in June 2005 was based on an annual average concentration of 0.3 mg/l and full design flow of 50.0 MGD. In a section which follows, it is now recommended that dischargers in the James tidal fresh region have their phosphorus WLAs based on a less stringent concentration of 0.5 mg/l, which provides some relief to Hopewell. In addition, more cost-effective alternatives to on-site treatment could become available through the nutrient credit exchange program now being developed.*

- *James River Association- "…urges the Board to exercise extreme caution in approving any increase to the waste load allocations based on the latest two model runs beyond the current approved allocations for the following reasons:"…"…prudent and preferable to provide some margin of safety in the pollution allocations...", (point source controls are) "most effective approach to achieve water quality standards…", and "consistency with pollution allocations for other Virginia waters."*
- *Lynchburg Utilities – Review of model results demonstrate that WLAs approved at SWCB's 6/28/05 meeting were overly stringent and prove that higher point source WLAs will still achieve water quality standards. As a minimum, Lynchburg's total nitrogen and phosphorus WLAs approved in June are justified.*
- *Philip Morris USA – PMUSA's nitrogen WLA approved in June 2005 was based on the portion of the discharge deemed to be bioavailable to aquatic life. Concerns have been raised by EPA Region 3 staff regarding the study design used by PMUSA and their consultants, and the validity of the conclusion that a significant portion of the TN discharged (dissolved organic-nitrogen, which makes up nearly 88% of the TN) is not bioavailable. Discussions have been held among PMUSA and their consultants, EPA, and DEQ staff to identify the additional information needed to further justify the claim about bioavailability, and PMUSA will follow up in an attempt to address the concerns raised, so that the provision in Section 9VAC25-720-40 B. can be utilized to reduce the regulated portion of their discharge to the amount approved in June (18,547 lbs/yr). For now, the TN allocation has been revised to 139,724 lbs/yr, which includes the dissolved organic-nitrogen. It should be noted that even this WLA represents a significant reduction in the discharged TN load since PMUSA began modifying their wastewater process in 2001 to achieve near limit-of-treatment removal of ammonia and oxidized nitrogen, two forms that are bioavailable. From 1999 to 2000, PMUSA's average TN load was approximately 203,000 lbs/yr.*
- *Richmond Utilities - Review of model results demonstrate that WLAs approved at SWCB's 6/28/05 meeting were overly stringent and prove that higher point source WLAs will still achieve water quality standards. As a minimum, Richmond's total nitrogen and phosphorus WLAs approved in June are justified. "The management options…cut point source allocations more than the modeling results warrant. It is strongly recommended that if the DEQ believes in a market driven approach to achieve potential early reductions and continuous decrease in nutrients in the James River watershed, interpretation of modeling results should meet with the goal of incremental changes and equity between PS and NPS."*
- *South Central Wastewater Authority – encouraged by modeling results which indicate SCWA's total nitrogen and total phosphorus WLAs, based on management options (5 mg/l TN and 0.5 mg/l TP), at current and requested future design capacities of 23 MGD and 27 MGD, respectively, would meet the water quality standards.*
- *Virginia Association of Municipal Wastewater Agencies – concur with WLAs resulting from treatment levels simulated in recent model runs for above-fall-line (6.0 mg/l TN; 0.5 mg/l TP) and tidal fresh dischargers (5.0 mg/l TN; 0.5 mg/l TP). Set lower estuary total nitrogen WLA at 6.9 million pounds per year (6.7 MPY for HRSD plants), for the reasons detailed in HRSD's comment letter.*

***The agency response to these comments**, as well as the other James discharger requests for less stringent treatment requirements submitted during the July-August re-opened review period, has*

been addressed through the management options described above. Following is the recommended option, with justification for the treatment levels selected.

***1. Waste Load Allocations for James Above-Fall-Line and Tidal Fresh Regions**: Base POTW allocations for above-fall-line region on TN = 6.0 mg/l and TP = 0.5 mg/l, and for the tidal fresh region on TN = 5.0 mg/l and TP = 0.5 mg/l. Justification for this selected option:*

- *Consistent with approach of using stringent technology to protect water quality.*
- *These allocations are predicted to achieve the proposed water quality chlorophyll summer criteria of 23 ug/l in the lower tidal fresh segment, and 22 ug/l in the oligohaline segment.*

***2. Waste Load Allocations for James Lower Estuary Region**:*

a. ***Total Phosphorus** - Base POTW allocations in lower estuary on TP = 1 mg/l. Justification for this selected option:*
   - *Higher salinity region is less responsive to changes in phosphorus levels.*
   - *Minimum BNR nutrient removal level is acceptable.*

b. ***Total Nitrogen** – set total point source allocation in lower estuary at 6.15 million pounds per year (MPY), with 6.0 MPY allocated to HRSD facilities in aggregate. Justification for this selected option:*
   - *Represents a significant reduction in TN load (~1.0 MPY) compared to current discharge levels.*
   - *Contributes to restoration of SAV by improving water clarity and reducing algal growth on plant leaves.*
   - *Model predictions show some benefits for chlorophyll levels at the segment level under long-term hydrology conditions. Local water quality on shorter time scales should also be improved.*
   - *Nutrient Credit Exchange Program allows an owner of multiple plants in the same river basin to receive aggregated waste load allocations.*